**In the Claims:**

1. (Currently Amended) A method of creating entanglement between first and second atomic ensembles, comprising:

propagating a first pulse of light generated in said pulsed source of light into ~~a~~ the first atomic ensemble having a first collective excitation state, wherein photons in said first pulse of light have an energy that can excite the first atomic ensemble to the said first collective excitation state so as to generate first photons;

propagating a second pulse of light generated in said pulsed source of light into ~~a~~ the second atomic ensemble having a second collective excitation state, wherein photons in said second pulse of light have an energy that can excite the second atomic ensemble to the ~~said~~ second collective excitation state so as to generate second photons;

interfering the first and second photons at an interferer while preventing photons not resulting from the generation of collective excitations in said first atomic ensemble and said second atomic ensemble from reaching said interferer by arranging a first filter in a first optical path between said first atomic ensemble and said interferer, and a second filter in a second optical path between said second atomic ensemble and said interferer;

detecting the interfered photons so as to establish entanglement between the first and second atomic ensembles and;

detecting the interfered photons with a first or second photon detector and controlling said first single photon detector and said second single photon detector with a photo detector controller.

2-4: (Canceled)

5. (Previously Amended) The method of claim 1 wherein the first and second light pulses each have a substantial probability of generating collective excitations in the first and second atomic ensembles, respectively.

6. (Previously Amended) The method of claim 1 including forming each atomic ensemble from one of solid matter, gaseous matter and liquid matter.

7-8: (Canceled)

9. (Previously Amended) The method of claim 1 wherein generating the first and second photons involves a Stokes process.

10. (Previously Amended) The method of claim 1 wherein the first and second atomic ensembles have substantially identical collective excitation energies.

11. (Previously Amended) The method of claim 1 wherein said first and second atomic ensembles comprise alkali atoms.

12. (Previously Amended) The method of claim 1 wherein said first and second atomic ensembles comprise Cesium atoms.

13. (Previously Amended) The method of claim 12 wherein the Cesium atoms in each one of said first and said second atomic ensembles has a density of between 1 and 100 atoms per cubic micron.

14. (Canceled)

15. (Previously Amended) The method of claim 1 including synchronizing the first and second light pulses with a synchronizer.

16. (Previously Amended) The method of claim 1 including generating the first and second light pulses with a laser.

17. (Previously Amended) The method of claim 1 including generating the first and second light pulses with a flash lamp.

18. (Previously Amended) The method of claim 1 wherein said first ensemble and said second ensemble contain only atoms.

19. (Previously Amended) The method of claim 1 further comprising ceasing generating - first and second light pulses when one of two single photon detectors detects a photon.

20. (Previously Amended) The method of claim 1 further comprising entangling a third atomic ensemble optically coupled to the first atomic ensemble with a fourth atomic ensemble optically coupled to the second atomic ensemble.

21. (Previously Amended) The method of claim 20 further comprising entangling said first and second atomic ensembles with said third and fourth atomic ensembles.

22. (Previously Amended) The method of claim 21 wherein said entangling comprises detecting a photon propagated through a second interferer using a third single photon detector and a fourth single photon detector.

23. (Previously Amended) The method of claim 22 further comprising filtering light pulses transmitted towards said second interferer.

24. (Previously Amended) The method of claim 21 further comprising entangling said third and fourth atomic ensembles with fifth and sixth atomic ensembles.

25. (Previously Amended) The method of claim 1 further comprising repeated applications of the acts defined in claim 1 with a number of additional sets of atomic ensembles to provide long distance quantum communication over a communication distance via entanglement between remote ones of the atomic ensembles in a manner such that that number of additional atomic ensembles scales polynomially with the communication distance.

26. (Previously Amended) The method of claim 1 further comprising repeated applications of the acts defined in Claim 1 with a number of additional sets of atomic ensembles to provide long distance entanglement generation over a communication distance in which the number of atomic ensembles scales polynomially with the communication distance.

27-57: Canceled